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# Facilitating Communities of Practice in Teacher Professional Development

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## Abstract

In this paper, we describe a project for teacher professional development addressing the introduction of information and communication technology and problem and project-based approaches into teaching and learning at the university level. The project supports the argument that learning as part of a community of practice can provide a powerful and useful model for teacher professional development and that problem oriented project pedagogy and information and communication technology can be used to shift from a model based on delivery of information towards a pedagogy favoring learning as knowledge construction through collaboration, projects and problem orientation.

## Keywords

Communities of practice, teacher professional development, higher education, problem and project-based learning.

## Introduction

Universities play an important role in the knowledge society. They have the potential to enhance the learning capabilities of students, and to provide opportunities for them to become lifelong learners (Brown & Duguid, 2000). To realize this potential, universities have to reinvent their conception of education by taking the importance of social networks into account (Fischer, Rohde, & Wulf, 2007), and by consider the adoption of innovative pedagogical approaches (World Bank, 2000, 2002).

Advances in information and communication technology, and modern pedagogical approaches are creating new opportunities to design innovative environments to support learning. Technology brings opportunities to rethink teaching and learning and for change and reform practice (Dirckinck-Holmfeld, 2002). It has the potential to transform the role of teachers and students. In despite of significant efforts to change the nature of learning, the traditional model of education is still widely practiced in universities (Fischer et al., 2007) as well as a slowly uptake of information and communication technology (PLS Rambøll Management, 2004). We know that one of the most important factors in any educational change is to change teachers practice, therefore if universities really want to make a qualitative change in their conception of education; they should provide teachers with professional development in new pedagogical practices and in methods of using information and communication technology and its potential in education (Barab & Duffy, 2000; Karlsson, 2004).

Effective technology integration should be based on a philosophy of learning that promotes a student-centered approach, in which students construct rather than receive knowledge, and teachers provide a framework that facilitates students' learning. As a consequence, the role of the university teacher is changing and will continue to change, but in many cases current teacher preparation is insufficient to sustain this change. To accomplish their new role, teachers need to learn to work with a new set of skills and knowledge. To deal with this challenge many universities over the world are devoting human and financial resources to create centers for academic technologies, who have the mandate to support personnel who want to integrate technology in teaching and learning, as well as professional

development opportunities for academic members at the institution (Brogden & Couros, 2006; Cedeño, 2007; Dirckinck-Holmfeld & Illera, 2006). But, in these efforts it is important to consider that we cannot expect that teachers change their regular practice after one or two courses. Teachers need in-depth, sustained assistance in their efforts to integrate technology into the curriculum (Kanaya, Light, & McMillan Culp, 2005), and in their efforts to shift from a teacher-centered to a student-centered approach. Teachers need opportunities for professional learning and to collaborate and exchange experiences and knowledge with colleagues. Furthermore, McLaughlin and Mitra (2001) found that a community of practice is an important vehicle for introduce new teachers into educational reforms.

In this paper, we describe a project for teacher professional development addressing the introduction of information and communication technology and problem and project-based approaches into teaching and learning in the Universidad Nacional in Costa Rica (UNA). The project supports the argument that learning as part of a community of practice can provide a powerful and useful model for teacher professional development (Barab & Duffy, 2000) and that problem oriented project pedagogy and information and communication technology can be used to shift from a model based on delivery of information towards a pedagogy favouring learning as knowledge construction through collaboration, projects and problem orientation (Dirckinck-Holmfeld, 2002; Kolmos, Fink, & Krogh, 2004). First we describe the conceptual framework that supports the project and then we describe the project and the methodology proposed.

## Conceptual framework

The research is informed by a socio cultural perspective on human learning and development (Vygotsky, 1978), where learning is regarded as a social process. In this theoretical approach, learning is considered as always mediated by tools, and as a social and historic construction. Furthermore, language and artifacts are cultural and social products. Learning in the socio-cultural tradition is achieved as an object oriented approach socially mediated by tools and artifacts taking place within a broader social and cultural activity system (Dirckinck-Holmfeld, Jones, & Lindström, Forthcoming). This research draw on the relation between the concepts of communities of practice, information and communication technology, problem oriented project pedagogy and teacher professional development.

The term community of practice comes from theories based on the idea of learning as social participation. It refers to the process of social learning that occurs when people who have a common interest collaborate over an extended period to share ideas, values, beliefs, languages, and ways of doing things (Wenger, 1998). According to Schlager and Fusco (2004), a community of practice can play an integral role in teacher professional development. They define teacher professional development as

A process of learning how to put knowledge into practice through engagement in practice within a community of practitioners (p.4).

In this context, collaboration between teachers is a means to raise teacher performance, because teachers have the opportunity to gain access to new information, clarify their ideas and beliefs, examine different ways of thinking about teaching and reflect on their own practice (Rhodes & Beneicke, 2002).

For teachers, the potential of technology to support collaborative learning based on notions of shared knowledge construction is an important opportunity. Networked technologies can provide an alternative professional learning experience that involves participation in a community of learners, and help encourage them to learn new norms, values, and practices through participation in new forms of activity. Networked technologies make possible to overcome time and space, and to offer, in a cost-effective way, high quality collaborative learning experiences to geographically dispersed teachers (Dirckinck-Holmfeld et al., forthcoming).

Problem oriented project pedagogy (POPP) is a pedagogical framework that incorporates a series of integrated didactical principles as the basis for the design of the learning environment: problem formulation, enquiry of exemplary problems, participant control, joint projects, interdisciplinary approaches, and action learning (Dirckinck-Holmfeld, 2002). In this pedagogical approach, the learning is situated, meaning is created from the real activities of daily living and working, and knowledge is created

in and through working together with a common purpose (von Kotze, 2003). POPP provides teachers opportunities to work together, acknowledges their personal beliefs and experiences, and expands their knowledge and skills as they engage in learning more about problems related to students, teaching, learning, and curriculum, allowing them to integrate their professional practices with their professional development.

POPP requires that the participants in the learning environment engage in a shared enterprise through the process of problem formulation and solution, and develop a shared repertoire of actions and discussions. Each participant brings a variety of skills and experience to accomplishing their goal; therefore, there are multiple ways to participate. Participants' roles and responsibilities can vary between central and peripheral participation based on their degree of knowledge, interests, and experience with a particular problem and project. As such, it is a vehicle for the development of communities of practices and inter-dependencies among the participants (Coto & Dirckinck-Holmfeld, forthcoming; Dirckinck-Holmfeld et al., forthcoming).

Under these perspectives we are going to analyze what are the conditions to nurture a change oriented community of practice in order to transform teacher's practice, using technology and problem oriented project based pedagogy as means to foster the change. Teachers will be encouraged to form a community of practice in the hope that they will support each other in the process of innovate their practice.

## **Project description**

The overall aim of the research project is to foster an innovation in the teaching practice of UNA teachers, through the use of innovative pedagogical approaches and information and communication technology to enhance learning. We take as a point of departure the work started by the ELAC<sup>1</sup> project which established the ground for a development strategy based on the integration of pedagogy, technology and organizational changes (Dirckinck-Holmfeld & Illera, 2006). The project is based on communities of practice as a driving force to innovate educational practices in higher education and it is supported by UNA-Virtual, the center of UNA, which is in charge to advise, promote and develop initiatives of incorporation of networked technologies in teaching.

UNA Virtual has to provide professional development opportunities for university teachers, support them in the process of integrate information and communication technology in teaching and learning, and provide support in instructional design, graphic design and multimedia. As part of this mission, it has designed an "Educational Innovation" course, whose objective is that teachers learn new didactic strategies and how to integrate technology into their teaching (Hernández Pereira, 2007). In the first period of 2007 two groups with the participation of 38 teachers were opened, and as part of the outcome of the course, the participating teachers put in practice their learning in the second period of 2007. We consider this experience as a first interaction of the project, therefore the project uses an incremental approach using this previous experience to develop a new framework (second interaction) to support and help teachers to move from teacher-centered models of learning toward more student-centered models, and supporting them in the process of use technology tools and resources in ways that increase student's achievement.

Although a community cannot grow by command, the conditions for its growth may be cultivated (Wenger, McDermott, & Snyder, 2002). In the second interaction of the project, we are designing a community with teachers from several campus of the university. This learning community is the first step to cultivate the desired community of practice. We know that designing a learning community does not guarantee that a community of practice will arise, however our goal is to develop this community in ways that can foster the emergence of a community of practice.

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In the second interaction the participants are not located on the main campus of the UNA (as in the first interaction). They come from four geographically distributed campuses, have diverse fields of knowledge and diverse approaches to teaching and learning as a result of their own professional experiences and context. Therefore, it is very important for the project to use an approach that respects and utilizes teachers' professional knowledge. The learning environment is being designed as a framework for flexible and blended learning, regarding teachers as the main agents of their professional development, supported by an environment rich in challenges and interactions around the philosophy and methodologies of problem and project based learning (Collis and Moonen, 2001)

## Methodology

Design-based research is the methodology chosen to help us in the process of understanding the conditions that can affect the emergence of a community of practice within the online community, and what kind of scaffolding is necessary to sustain it. Design-based research is an emerging methodology for the study of learning in context "through the systematic design and study of instructional strategies and tools" (Design-Based Research Collective, 2003, p.5). Wang and Hannafin define it as

a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories (Wang & Hannafin, 2005, p.6).

We chose to incorporate design-based approaches into our research, because design provides us with opportunities to impact on education and to advance our understanding on the dynamics between information and communication technology, POPP and communities of practice. Design plays a critical role in the development and refinement of theories because educational designs embody conjectures about learning that can be empirically refined (Sandoval, 2004). Through a continuous process of refinement, this methodology allow us to monitor how the community develops practices, to analyze the discrepancies between the intended design and the emergent usage of it, and to implement revisions that make learning more efficient (Johnson, 2001). If some elements of the design are not working, it is necessary to modify the design and describe the reasons for making the modifications (Collins, Joseph, & Bielaczyc, 2004).

At the initial stage of the second interaction's project, the researchers and members of UNA Virtual are working jointly to develop a framework to support the project activities and outputs. This framework takes into account pedagogical, technological, but also sociability issues that are important in establishing functional online communities (Barab, Thomas, & Merrill, 2001). Data collection to evaluate the first interaction and to prepare the second interaction includes surveys, open ended interviews and focus groups:

- 1 A focus group with the participants of the first interaction in order to know their experiences with the "Educational Innovation" course, strengths and weakness on the process of redesign their practice and their interest for participating in a community of practice.
- 2 Interviews with the facilitators and tutors of the "Educational Innovation" course.
- 3 A survey with the new participants to determine their characteristics, needs and expectations as well as their previous experiences with problem/project based learning and technology in education.
- 4 A workshop with the new participants to motivate them to fully participate in the community and to make an induction about how to use the technological platform.

The whole process is established in three main phases: designing for change, experiencing the change and understanding the change; in each of these, specific design, facilitation, and support strategies are being planned to help grow and sustain the community.

## **Designing for change**

The first phase consist of a number of formal activities, with the goal to recruit the initial members, introduce them to each other and bring them basic knowledge about the main topics. These activities are the first step to promote the formation of the community of practice (Barab, Klin, & Gray, 2004). In this phase, 20 UNA teachers from four geographically dispersed campuses are going to participate in a series of workshops about different topics such as learning pedagogy, problem and project based learning, strategies for working with the new generations of learners, and educational technology.

The workshops take place this spring and will be facilitated by members of the UNA Virtual and the researchers. Their role is to guide discussions, to encourage full, thoughtful involvement of all participants, and to provide feedback. Facilitators will help to deepen the learning experience for participants by encouraging productive interaction and critical reflection on daily teaching practices (Gray, 2004).

The objective in this phase is to offer teachers opportunities to participate in a number of collaborative activities that help them to know each other, to develop trust and to improve their pedagogical and technical knowledge. Furthermore, we will take advantage of the power of network technologies to provide UNA teachers with access to other more experienced colleagues, experts and resources, and to exchange with them ideas, experiences and pedagogical strategies. In this phase we are interested to analyze how the understanding of the participants about the different topics of the workshops change over time, participant structure, group identity, engagement, collaboration, and if we can detect characteristic of an emergent community of practice.

## **Experiencing the change**

The second phase of the project is more focus on experimental learning. In this phase, the teachers are going to re-design their practice and to experiment it with their students. In this process they will be encouraged to support each other, to discuss problems, to engage in the challenge of innovate their daily practice and to discover what knowledge is valuable to share. Our goal is that the emergent community of practice helps teachers to face challenges, to have access to more expert peers, to share experiences, to build a professional identity, to improve their personal development, and to sustain their learning after the formal training. In this second phase we want to analyze the cultural impact of teacher's re-designed practices, their integration of the new knowledge in their diverse fields of expertise, and to what extent the community of practice supports them in this challenge. To collect the data, we are going to use multiple methods, including observations, interviews with some of the participants, analysis of communications and artifacts produced in the workshops and research journals kept by the researchers and the workshop's facilitators.

## **Understanding the change**

The ultimate goal of the project is to foster a transformation in the UNA teachers. We consider teachers' participation in the community of practice as an important condition for this transformation. Participation enables learning and learning can changes who we are. Under this premise, we understand that this change may take place on many levels: change of practice, change of identity, change of membership and change of trajectory (Dirckinck-Holmfeld et al., forthcoming).

UNA teachers have diverse professional identities and they participate in a diversity of practices. Through the engagement in discussions and collaborative project work they will be confronted with the necessity to negotiate their current multiple practices and experiences. The new theoretical knowledge and training in ICT and problem formulation give teachers methodological skills which should impact in their professional practice towards more focus on collaborative pedagogies and socio-constructivist understandings of learning.

According to Wenger (1998), we can not design learning, only design for; however a conscious effort is being putting into the design of activities, spaces and organization that engage teachers and facilitators in

dialogues, discussions, project work and negotiations, fostering in this way changes in their identities, practices and trajectories (Goodyear, Jones, Asensio, Hodgson, & Steeples, 2001). In this third phase the analysis will be focus on theoretical conceptualizations, mutual reflections and redesign. We want to characterize the critical elements for each phase in order to be able to evaluate the design in terms of the implementation, participants' needs, interactions and goals with a special interest to evaluate POPP as the mean for change and for the establishment of the community of practice.

## Conclusions

We believe that the concept of communities of practice in combination with problem and project methodologies can be used as an effective model for teacher professional development. It offers a shift of focus from formal training to learning in practice, where learning in practice is a participatory process that involves "doing, becoming, and belonging, not simply acquiring" (Ng & Hung, 2003, p. 62)

According with our goals to contribute to the process of transforming teaching practice and to foster a culture of problem orientation, projects, collaborative learning and sharing knowledge, the design proposed in this paper includes fostering relationships between teacher participants, exploration of a domain of knowledge in which participants share an interest, and development of innovative practices that support change and further learning. The project envisions that teacher participants will form a self-sustaining community of practice within which they will improve their pedagogical and technological knowledge through connecting and learning from each other, through discussing common problems and issues, sharing good practices and collaborating on projects. The project will further more provide insights into the conditions to cultivate a community of practice, the social dynamics of the community, the technology as a learning and knowledge sharing infrastructure, and the organizational support of UNA.

Currently, the project is in progress, but when it ends we hope to be able to offer to the academic community relevant information about the conditions necessities to nurture a community of practice aimed to transform teacher's practice.

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